New network structures: decentralization, prosumers and the role of online platforms

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contents

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New network structures: decentralization, prosumers and the role of online platforms

This issue of the Network Industries Quarterly looks into the major challenges infrastructure regulation is currently facing as a result of technology, indirect network effects, newly emerging network structures, and new actors. The rapidly evolving Information and Communication Technologies (ICTs) have significantly challenged the traditionally stable landscape of infrastructure services provision. The new data layer over the traditional infrastructure and service layers is transforming network industries: online platforms create new indirect network effects, they allow new service providers to enter the market , and they challenge the central role of traditional infrastructure managers/service providers as entities ensuring the coordination of the sectors.

The de- and re-regulation of the different network industries is an on-going process at both the national and global levels. As this process unfolds, ever new phenomena emerge, necessitating a constant reassessment of the content and objectives of regulation.

Following the **7th Conference on Regulation of Infrastructures** which took place on June 21 and 22, 2018 with a particular focus on the regulatory challenges facing network industries in the transport, telecoms, water and energy sectors, four papers were selected for this publication due to their topical relevance.

Frieden examines how Internet ventures operate as intermediaries serving both upstream sources of content and applications, as well as downstream consumers, and considers how governments can respond to the onset of price and quality of service discrimination within the Internet ecosystem.

Knieps looks at ICT innovations as the key drivers for a paradigm shift from traditional intramodal transportation markets to intermodal shared mobility markets. He identifies the changing necessities of regulations regarding market entry, public subsidies, and technical regulations, and presents the potentials of pilot projects, as well as the impact of shared mobility on congestion and pollution.

Rossotto et al. analyse the existing literature on digital platforms and distinguish four aspects, which policy makers should keep in mind, working on appropriate policy frameworks for digital platforms in emerging markets. These four aspects are: definition of multisided-platforms; emerging business models; technology and behavioral enablers; platform competitive dynamics.

Finally, **Vanrykel, Ernst and Bourgeois** look at the platform Share&Charge, and present its functioning and potential, before assessing the tax treatment of operations involved in the use of the platform.

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Network Industries Quarterly | Published four times a year, contains information about postal, telecommunications, energy, water, transportation and network industries in general. It provides original analysis, information and opinions on current issues. The editor establishes caps, headings, sub-headings, introductory abstract and inserts in articles. He also edits the articles. Opinions are the sole responsibility of the author(s).

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How Internet Platforms Intermediaries Affect Competition and Consumers

Rob Frieden*

This paper examines how Internet ventures operate as intermediaries serving both upstream sources of content and applications as well as downstream consumers. It considers how governments can respond to the onset of price and quality of service discrimination within the Internet ecosystem. The paper concludes that most governments have failed to revise and recalibrate tools that examine potential marketplace distortions and the potential for harm to competition and consumers. Regulatory agencies and courts have generated false positives, resulting in market intervention where no major problem exists, but also false negatives, where undetected major problems cause harm without remedy. The paper recommends a recalibration of market definition and analysis, including examination of both downstream and upstream impacts.

I. Introduction

Several segments of the Information, Communications and Entertainment (ICE) marketplace have dominant intermediaries that operate a platform needed by both upstream sources of content and downstream consumers. These ventures can achieve market dominance in a 'winner take all' (Malik 2015) competition by creating the dominant platform standing between upstream content sources and downstream consumers (Schumpeter 2017). In the markets for broadband carriage and many Internet service segments, such as social networking, winning ventures quickly can accrue scale and efficiency advantages as more and more consumers join the bandwagon and subscribe (Gal and Elkin-Koren 2017).

Successful insertion of an intermediary platform has generated both positive and negative impacts on consumer welfare, competition, the rate of innovation, employment and other key factors. On the positive side, intermediaries can promote efficiency and positive network externalities (Katz and Shapiro 1985; Moffatt 2016) where the overall value of a network and its ability to generate consumer benefits grows as more users participate. On the negative side, intermediaries, operating without significant competition, can extract high prices from both upstream and downstream participants, erect strong barriers to market entry, acquire competitors and use comparative advantages to dominate in both core and related markets such as the collection, processing and sale of 'Big Data' (Helveston 2016) about subscriber behavior.

Economists use the term two-sided markets to identify platform functions where transactions occur both upstream and downstream from the intermediary (Rochet and Tirole 2003, 2006; Armstrong 2006; Filstrucchi, Geradin, van Damme and Affeldt 2014). The business models used by intermediaries often rely on a strategic calibration of prices, often appearing to provide 'free' , or subsidized services to users on one side of the platform, typically downstream consumers. Consumers can access valuable services with zero financial payments, but they do have to pay by permitting intermediaries to compile information about their wants, needs, desires, Internet uses, searches and other behavior that can be processed and marketed to advertisers for better targeting of their commercial pitches. Privacy intrusions (Pasquale 2013) and the commodification of consumer behavior generate significant value that a platform operator can accrue often without subscribers fully understanding and quantifying the potential for reduced benefits.

This paper identifies defects in the ways most government currently respond to allegations of harm to consumers and competition. Governments can refrain from regulating access and tolerate market concentration as the proper reward for ventures offering desirable content and carriage services. Alternatively, they can impose ex ante safeguards to remedy anticipated harms to competition and consumers such as market concentration, price discrimination, reduced consumer welfare and captured consumer surpluses. Between these poles, governments can rely on courts or an expert regulatory agency to evaluate complaints and offer calibrated remedies.

The paper recommends that courts and government agencies should address marketplace distortions by recalibrating existing tools to examine the competitive and consumer impacts on both sides of an intermediary's platform.

II. Consumer Benefits from Two-Sided Markets

Intermediaries have operated in many marketplaces for centuries (Cohen 2018). Emerging broadband, digital platforms radically enhance the power and impact of such ventures resulting in vast changes to "the traditional equi-

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libria of supply and demand, blurring the lines between owners and users, producers and consumers, workers and contractors, and transcending the spatial divides of personal and professional, business and home, market and leisure, friend and client, acquaintances and stranger, public and private." (Lobel 2016: 90) Digital broadband platform operators can accrue substantial consumer benefits even as they increase market shares. A 'win-win' scenario combines ample benefits for platform operators and consumers by enhancing the value proposition in commercial transactions.

Digital broadband platform operators can quickly acquire scale economies (Peritt 2017) and efficiency gains by attracting growing numbers of users and spreading costs over a large population of users. The incremental cost to add an additional participant approaches zero, because many Internet-mediated markets have high initial, investment costs, but very low incremental costs incurred when adding users. Additionally, these platforms can accrue positive networking externalities (Lemley and McGowan 1998; Newman 2012) as subscribership grows. When intermediaries reach a critical mass of popularity, non-users see the advantages in joining the bandwagon which further enhances the comparative attractiveness of a specific platform operator vis a vis other competitors and options.

Platform intermediaries must deliver a compelling value proposition to generate consumer use, particularly when alternatives exist, with low entry barriers and switching costs. The combination of competitive necessity and more efficient operations can readily translate into the offering of lower priced products and services to consumers, particularly because two-sided platform operators can calibrate how much to charge each side:"[P]rofit-maximizing prices may require charging one side less than the marginal cost of serving that side. Empirical surveys of industries based on . . .[two-sided platforms] find many examples of prices that are low, or even negative, so that customers on one side are incentivized to participate in the platform" (Evans and Noel 2005:668).

III. Consumer Costs from Two-Sided Markets

Immediate and longer-term costs offset readily identifiable benefits from two-sided platforms. In the short term, ventures like Amazon enhance consumer welfare by offering a growing inventory of products and services at lower prices, the product of operational efficiencies and the willingness to eschew profits in exchange for increasing market share and scope. However, in the longer term, consumers may suffer from the loss of competition from 'bricks and mortar', local vendors as well as from the consequences of ever more accurate assessment of consumer price sensitivity and increasingly invasive collection of subscribers' consumption behavior and the brokering of such data by largely unregulated ventures (Kuempel 2016). At some point, online platform operators may consider their market position sufficiently impenetrable so that they can refrain from aggressive price cutting and forgoing near term profitability.

Additionally, these operators may have so developed data analytics that they can quite accurately set and frequently modify prices with an eye toward maximising profits (Fleming 2015). Dynamic pricing refers to the ability of product and service vendors to change prices quickly by collecting and analysing data about current consumer demand (Calo 2014; Adame 2016). Rather than set a fixed price, only occasionally raised or lowered, vendors can make frequent pricing changes based on current marketplace conditions. While such dynamic pricing arguably represents an efficiency enhancing, fine-tuning of price setting, consumers may consider it unfair and discriminatory.

IV. Subscriber Data Value and Lock-in Cost Missing in the Cost/Benefit Analysis

One can readily assess the benefits of access to intermediary platforms, but the costs are not as readily determined. Consumers may wrongly assume that they have free access, because no subscription payment occurs except to the carrier providing the broadband link. The free access conclusion fails to consider two somewhat hidden and not easily quantifiable costs: 1) the increase in the price of advertised goods and services, possibly better calibrated through data mining and 2) the monetary value accruing to intermediaries when they acquire, collate, analyse and sell consumer data, as well as auction advertising placements on their web sites (Bodie, Cherry, McCormick and Tang 2017; Woodcock 2017; Hacker and Petkova 2017).

Broadband intermediaries have achieved remarkable success in developing techniques to monitor, surveil, collect and sell subscriber data. This reduces the value position of what the intermediary offers because the ability to 'mine' subscriber data has value that can provide a substantial, new revenue stream from freely collected consumer data.

V. Deficiencies in Existing Government Oversight Models

Outside the European Union, (European Parliament 2016) most governments have failed to revise existing legal, regulatory and jurisprudential models and frameworks for application to issues raised by the onset of digital broad-

band intermediary platforms. This section addresses how traditional governmental strategies ignore fundamental differences between bricks and mortar and Internet-mediated transactions.

As a threshold matter, governments decide whether and how to intervene in a specific industry sector. They may opt to rely entirely on marketplace forces, confident that competition will force stakeholders to operate in ways that deliver a compelling value proposition for consumers without anticompetitive practices. Other governments may pursue the opposite: an interventionist approach, imposing ex ante rules and regulations, such as network neutrality (Frieden 2015) and common carrier regulation. Between these polar opposites, two alternative, possibly complementary, ex post strategies exist: 1) apply antitrust, consumer protection and prohibitions on unfair trade practices to remedy proven harms and 2) use dispute resolution through litigation and complaint filing procedures to fashion remedies that typically impose monetary fines and compulsory modification of business practices.

Each of the legacy models fails to achieve an ideal balance between governmental regulatory forbearance and intervention, primarily because the assumptions, strategies and tactics applied do not make essential adjustments reflecting the difference between digital, broadband networking and preexisting channels of commerce. Without modification of market definition and impact assessment, governments risk false positives, which trigger unnecessary marketplace intervention, or by reaching false negatives, which fail to trigger important safeguards based on an incorrect determination that no harm to consumers or competition has, or will occur.

VI. A Realistic Assessment of Platform Costs and Benefits

Consumers and governments may not fully understand the tradeoffs when digital, broadband intermediaries dominate many ICE market segments. One can readily appreciate the upside consumer benefits in having access to advertiser-supported content and Internet markets subsidised by ventures willing to forego short term profits for longer term market share and product diversification. A more difficult undertaking calculates what direct and indirect costs consumers incur, presently and in the future, for the opportunity to participate in 'winner take all' two-sided markets.

Prevailing economic doctrine, widely embraced by government legislators, judges and regulators, favors an inclination not to intervene in the marketplace, when identifiable, near term cost savings and other welfare enhancements flow to consumers. Much revered, so-called Chicago School marketplace assumptions (Bork 1978; Posner 1979; Crane 2014) and antitrust prescriptions may not make sense for digital, platform markets including the view that rational commercial actors (such as Amazon) never would pursue below market pricing given the unlikely opportunity to recoup current losses in the future. Likewise, a laser focus on efficiency and consumer welfare, as espoused by Robert Bork, may require a longer timespan that considers whether immediate and easily measured, short-term consumer welfare enhancements partially or completely offset in the longer-term. Such analysis requires scrutiny of both downstream and upstream market effects.

At the very least, it has become increasingly clear that consumers must contribute more value, than what they might infer from widespread promotion of 'free' and subsidised access.

Even in the short run, the value proposition from participating in two-sided markets may decline as consumers begin to understand the monetary value of the network usage data they generate and consent to having platform operators use for dynamic pricing of their goods and services and as a marketable commodity for sale to upstream advertisers.

In the longer term, the commodification of consumer data may accrue the greatest strategic and financial advantages for ventures that already have successfully exploited positive network externalities and have acquired large market shares. This advantage stifles innovation and competition if consumers cannot freely change their platform subscription and take their business to another platform. In the Internet ecosystem, consumers often lack complete information about what they must pay and what they lose in exchange for the opportunity to become a subscriber. Few consumers may have the disposition and wherewithal to undertake regular cost/benefit analyses as well as a determination whether to stick with the status quo, or to seek better terms and conditions. Such inertia enhances the ability of incumbent unicorn firms to maintain their market dominance.

Simply put, digital broadband consumers may likely suffer more significant, but not readily quantifiable harms, as digital, broadband intermediaries find new and more precise ways to maximize revenues from both upstream and downstream sources. Real or perceived lock-in by incumbent firms help maintain their market dominance.

Government agencies with jurisdiction to monitor such actions appear ill-equipped to provide effective oversight based on their fealty to now questionable economic and

antitrust theory, the inability or unwillingness to consider costs and benefits on both sides of the two-sided market and their emphasis on short term consumer benefits that may not seem as generous as initially estimated.

The Way Forward

Regulatory agencies with jurisdiction to safeguard consumers and reviewing courts should better calibrate the tools they use to investigate the potentially harmful effects of platform intermediaries on competition and consumers, with emphasis on the potential for privacy intrusions, unfair trade practices, market concentration and anticompetitive tactics. The goals for recalibration should focus on acquiring a better understanding of platform operator practices and their impacts rather than serve as a justification for more intrusive government oversight. Such a holistic approach can better assess the costs and benefits generated by platform intermediaries.

1) Assess Impacts on Both Sides of a Platform

To achieve greater clarity on the potential for beneficial and harm impact, courts and government agencies should examine platform operations on both upstream and downstream market sides. Using a cost benefit analysis, they may determine that harmful impacts on one side are offset by benefits on the other side. In other instances, they may identify greater harms or benefits when examining both sides.

By examining both sides of a digital, broadband platform market, courts and regulatory agencies can enhance the accuracy of their assessment of competition and whether consumers benefit or suffer from doing business with intermediaries having significant market share. In turn, they can better calibrate a remedy, or reach an empirically supported conclusion that no market intervention is necessary.

2) Consider Whether and How Lock-In Exists

Courts and regulatory agencies should consider the service options available to digital, broadband subscribers. In some instances, they have ample choices that prevent lock-in and evidence a competitive marketplace. However, in other instances, lock-in occurs, because consumers have few alternatives, or they incur costs, inconvenience, or reduced benefits if they leave the dominant platform.

Lock-in can occur even when alternative options exist. For example, an electronic commerce site, like eBay, may steer subscribers to a former affiliated electronic funds transfer platform operated by PayPal, even though alternative payment systems exist. Consumers have incentives to use PayPal, because the eBay site appears to favor and expedite such transactions and most vendors prefer to receive payment via PayPal. The preference for PayPal and the greater ease consumers have in using the preferred payment system generate substantial motivations to take the promoted and preferred path of least resistance.

Courts and regulatory agencies should consider the potential for lock-in beyond simply assessing whether a specific market segment has multiple platform operators. The existence of alternatives, by itself, does not evidence a competitive marketplace which can self-regulate. In the absence of viable service alternatives, courts and regulators should consider downstream consumers' quality of experience to ensure that the apparent preference for a single platform option promotes convenience and enhances consumer welfare.

3) Assess Market Impacts, Rather Than Simply Calculate Market Share

As noted, courts and regulators generally refrain from reaching conclusions about market competitiveness based solely on calculations showing a concentrated market, or one dominated by a single venture. Large firms having high market share may evidence a firm's superior business acumen, or the need for ventures to accrue economies of scale to thrive in a specific market segment.

On the other hand, market dominance may have significant and potentially adverse impacts on consumers and the potential for competition. Significant harm may arise because a firm can leverage dominance in one market to dominate other market segments. For example, Google dominates the market for Internet search and advertising, despite ample alternatives. Regulatory or judicial intervention is not warranted simply because Google has acquired substantial market share in Internet search. However, the company's success in dominating the search market also translates into substantial market share in the auctioning of advertising opportunities to search consumers (Newman 2014), making it possible for the company to impose anticompetitive terms and conditions.

Courts and regulators may need to consider the inter-relationship between a venture's successes in two or more markets, because dominance in combined, or interdependent markets, may trigger new or greater risks for consumers. Just as platform intermediary operation affects both downstream and upstream users, so too can market success in one market generate uncontested opportunities to extend market power elsewhere. Such leverage may have adverse impacts on the potential for new competition, even from innovative ventures.

VII. Conclusion

Digital broadband technologies and markets have reached a critical mass of market penetration and efficiency enhancements highlighted by embedded platforms. The Internet ecosystem has many market segments predominated by single ventures that have acquired dominance in 'winner take all' competition that rewards ventures best able to exploit positive network externalities. Intermediaries have conferred significant, identifiable benefits to consumers, who also incur offsetting costs, not all of which can be easily quantified or measured.

Intermediary platforms operators can calibrate cost recovery from both upstream and downstream users. In many instances, downstream consumers have benefitted from subsidies and pricing strategies that reduce, or eliminate direct, out of pocket costs. However, subsidy payers, such as advertisers, eventually recoup their costs through higher charges for goods and services. In light of enhancements in the acquisition, analysis and marketing of consumer behavior data, both vendors and platform intermediaries now have more diversified and extensive ways to recoup costs and to improve prospects for generating more revenues. Such data mining can impose new costs on consumers who must tolerate ever more extensive privacy intrusions in exchange for access to so-called free services. Enhanced consumer surveillance can impose lower or higher costs as exemplified by dynamic pricing that frequently changes rates through algorithmic analysis of overall demand, as well as a prediction of a prospective customer's intensity of preference for a particular good, or service.

Considering the mixed impacts of embedded intermediaries on competition and consumers, legislatures, courts and regulators should apply new tools for assessing current and prospective impacts. Unfortunately, the speed of innovation and the convergence of technologies and markets have exceeded the ability of governments to stay current. Accordingly, the tools used to assess market impacts have become ill-suited and poorly calibrated to meet new challenges (Brandenburger, Breed and Schoning 2017). Conventional competition policy and economic theories lack an emphasis on identifying both short term and longer-term consequences of platform operations. While immediate consumer welfare enhancement supports regulatory forbearance, governments need to consider whether and how longer-term impacts will remain benign or favorable.

In too many instances, governments have overstated consumer benefits and the absence of competitive harm. Most courts and regulatory agencies have not considered an intermediary's impact on both upstream and downstream markets, failed to consider fully whether and how subscriber lock-in has occurred and generated rationales excusing substantial market concentration based on short term consumer benefits that may not be as generous if offsetting privacy intrusions are considered.

Going forward, governments should appreciate that platform intermediaries do not operate as charities and that the conferral of benefits to consumers may be offset by negative impacts on both consumers and competition, even in the short term. A more holistic examination of impacts, without placing a premium on short term consumer benefits, would generate a more accurate assessment of the mixed impacts generated by platform intermediaries.

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Network Economics of Shared Mobility[1]

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ICT innovations are the key drivers for a paradigm shift from traditional intramodal transportation markets to intermodal shared mobility markets. The changing necessities of regulations regarding market entry, public subsidies, and technical regulations are identified, and the potentials of pilot projects, as well as the impact of shared mobility on congestion and pollution, are analyzed.

The evolution of markets for shared mobility services

Shared mobility services provide transportation services without requiring individual ownership of the vehicles for exclusive use. Shared mobility services can be non-commercial (for example, reciprocal ride sharing organized by a peer group) or commercial. There are many forms of commercial provision of shared mobility services, either by small-scale vehicles (such as cars, minibuses, and bicycles) or mass transit of large capacity transportation (trains, subways, etc.). The owner of a car may rent his or her vehicle out for others to use for limited periods of time, or offer taxi services organized by a ride-sourcing company. Alternatively, vehicles may be owned by a platform operator organizing on-demand transportation services or may be in shared ownership organized on a peer-to-peer basis, or vehicles may provide rail and bus transit: "…rail and bus transit were the most frequently used shared modes, followed by bikesharing, carsharing, and ridesourcing …" (Feigon and Murphy 2016: 7). On-demand mobility can be provided via self-service concepts or for-hire service concepts. For fully automated (driverless) vehicles, the concept of self-service is changing, as the real-time driving activity is no longer performed by the driver and has shifted to a platform (Transportation Research Board 2015: 1–22; US Department of Transportation, Federal Highway Administration 2017, chapters 1, 2).

An important consequence of shared mobility is the convergence of intramodal transportation markets towards intermodal shared mobility markets. An evolving multiplicity of combinations between shared mobility services provides substitutes for individual private car trips, such as taxis, car rentals, car sharing, minibuses, buses, and high-capacity public transit with trains, subways, or tramways. The smaller bundling advantages of shared cars and minibuses may be combined with the greater bundling advantages of buses and the even greater bundling advantages of high-capacity public transit by providing seamless shared mobility service networks. Boundaries are beginning to blur between shared on-demand mobility services (such as bus-on-demand services) with flexible stops and routes, and public transit with scheduled (timetabled) services with fixed stops and routes. Shared mobility can extend the scope of public transit, providing feeder services for public transit by tackling the first-and-last-mile problem (US Department of Transportation, Federal Highway Administration 2017: ix).

Virtual networks for shared mobility services

Although there are different types of shared mobility services with heterogeneous information and communication technologies (ICT) requirements, they typically rely on real-time, location-based information to enable app-based operating platforms coordinating and organizing the on-demand provision of mobility services. Examples are bicycle sharing, car sharing, ride sharing, ride sourcing, minibus-on-demand with virtual stops and flexible routes, driverless shared mobility services, and (high-capacity) public transit. On-demand mobility services require real-time, location-based mobile communication services combined with mobility apps. App-based mobility services result in a convergence of transportation services provided by taxis, private hire vehicles, and ride-sourcing platforms (commercial transport apps) (OECD/ITF 2016c).

From a network economic perspective, the complementary role of virtual networks for the design of smart physical networks is important, combining a required QoS bandwidth capacity with other virtual components (Knieps 2018). Virtual networks for shared mobility services are based on combinations of real-time mobile communications, global navigation system services (geopositioning), and sensor-generated data processing (OECD/ITF, 2015b, 2016b). Infrastructure-generated data are increasingly replaced by sensor-generated data via mobile phones, on-

[1] Helpful comments by the participants of the 7th Florence Conference on the Regulation of Infrastructures, in particular by Matthias Finger and Juan José Montero Pascual as well as Volker Stocker are gratefully acknowledged.

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board navigation devices, and vehicle-to-vehicle communications. ICT for shared mobility services are based on multi-platform sensoring technologies as well as data storage and transmission capacity in vehicles that are able to precisely locate and track people and vehicles supported by global navigation satellite systems (GNNS). Examples of location-based data services include taxi-hailing apps and ride-hailing apps, road navigation and multi-modal routing services, and multi-modal big data processing (OECD/ITF 2016b; GNNS 2017).

Shared mobility markets and the challenges for regulations

The necessity for institutional reforms, including free entry into shared mobility markets, competition for subsidies, and technical regulations, are considered below.

- Free entry and competition in shared mobility markets

The abolition of legal entry barriers and regulatory market splits is unavoidable. Prosumer peer-to-peer activities as well as business-oriented market activities providing shared mobility can only flourish if all legal entry barriers in the markets for transport services are abolished. Market entry regulations with licenses and public price fixing, as in the German taxi market, serve to establish cartels. Such market regulation not only interferes with price competition and market-driven entry and exit decisions, but also obstructs the search for new innovative mobility concepts. Due to app-based ICT innovations, services provided by taxis, private-hire vehicles, and ride sourcing services are converging and belong to the same relevant market for individualized mobility. Entry regulations via licenses, geographic restrictions, and fare setting for taxis are not only contrary to the general principles of open markets but also cause artificial regulatory market splits compared to private-hire vehicles and ride sourcing services (OECD/ITF 2016c: 6). Moreover, competition between individualized mobility services and shared on-demand mobility services with shared taxis, taxi buses and bus-on-demand services should not be disturbed by regulatory market splits.

- Competition for subsidies of public non-cost covering shared mobility services

The comparative advantages of different forms of shared mobility services are relevant in densely populated urban areas, but also in rural areas with low population density. A major change is that the concept of "public transport" is no longer limited to scheduled services, but can also include on-demand mobility services (OECD/ITF 2015c). If demand is so low during certain periods of the day that offering a scheduled train or bus services would result in large deficits, the publicly desired transport service could be provided by a shared minibus or shared taxi service; even individual ride-sourcing trips should not be excluded. In the context of a transparent bidding procedure, the most cost-efficient public mobility service can be chosen, exhausting the comparative advantages of scheduled mobility services versus on-demand mobility services depending on the local/regional demand circumstances and thus minimizing public subsidies.

- Technical regulations and consumer protection

Technical regulations in shared mobility markets focusing on health and safety, as well as insurance and consumer protection through adequate laws and technical standards, are gaining increasing relevance and have raised controversial debates regarding the extent to which additional rulings are necessary (Transportation Research Board 2015: 62–71). Other issues regarding the interaction of public and private spheres are parking and access to public space, both for private businesses and for non-profit purposes, with competing operators and transportation services as well as taxation on shared mobility. Data sharing (open data), data privacy protection, and cybercrime protection are also gaining relevance. Of particular importance is safeguarding privacy in the context of location-based mobility data (OECD/ITF 2016b:21–26; OECD/ITF 2015b: 33–58).

Get the bandwagon rolling: The role of pilot projects

"Kutsuplus", the world's first pilot project providing a fully automated, real-time on-demand public minibus service with flexible routes and virtual stops, started in 2012 in Helsinki. The project was initiated by Helsinki Regional Transport Authority (HSL) to provide incentives to substitute private car trips with an on-demand minibus service, thereby reducing congestion and air pollution. Routes were optimized on the basis of real-time trip orders from customers using a GPS-enabled smartphone. Passengers with roughly the same pick-up and end-point locations were allocated to the same vehicle. The platform bundled all requests with similar routes and informed users about the closest virtual stop. The transportation service of Kutsuplus offered a flexible, real-time-based choice of routes without fixed departure times or fixed entry and exit points, comparable to a shared taxi service. The goal was to assess the technical feasibility of the project and to get experience on user acceptance over a three-year period. The Kutsuplus pilot project gained worldwide attention as an innovative forerunner ICT project that could provide new impulses to public transit with a real-time on-demand service that strongly reduced private individual car traffic. It was considered a success due to strongly growing demand

and customer requests to extend the service areas. A further expansion of the service network would have required a significant increase from 15 minibuses to 45 in 2016 and to more than 100 in 2017, but the necessary investments could not be realized.[2] Nevertheless, the goal is to develop further shared mobility services based on more extended Kutsuplus-type services (Helsinki Regional Transport Authority (HSL), 2016). Although the minibuses in the Kutsuplus pilot project were able to choose demand-oriented virtual stops and virtual routes on a fully automated basis, they still involved drivers, which were a high cost factor. Therefore, the start of a regular bus line in Helsinki with a driverless bus in 2017[3] is opening up interesting new perspectives for the future. In the meantime, the potential for Kutsuplus-type bus-on-demand services are also being considered in other towns; examples include the American city of St. Louis, Missouri[4] and a ride-pooling-project in Hamburg starting in January 2019.[5]

Shared mobility markets as driver to reduce congestion and pollution

The future role of shared mobility markets in reducing congestion and environmental problems within cities is a challenging problem worldwide. The question of the extent to which shared on-demand mobility services such as shared taxis, taxi-buses, or bus-on-demand should replace private car traffic is highly controversial. Moreover, the interaction between shared on-demand mobility services and high-capacity public transit by train, subway, ferry, and tramway plays an important role.

In recent years, the International Transport Forum at the OECD has conducted several simulation studies to investigate the impact shared on-demand mobility services would have on replacing other forms of travel and thus reducing traffic congestion and air pollution. Within a real urban context under the application of real mobility and network data, different reform scenarios have been analyzed, with particular focus on the complete or partial replacement of private car traffic by shared on-demand mobility services. It is assumed that a central mobility dispatcher coordinates the matching of shared vehicles to passengers, centralizing all real-time information and optimizing routes and stops to fit the transportation requirements of each passenger, according to a set of time-minimizing rules. Depending on heterogeneous travel requirements, different quality standards regarding travel time and travel duration may be offered. Shared mobility simulations were carried out for Auckland, New Zealand's largest city (OECD/ITF 2017a); for Lisbon, a mid-sized European city (OECD/ITF 2015a, OECD/ITF 2016a); a follow-up study for the greater Lisbon Metropolitan Area (OECD/ITF 2017b); and for the Helsinki Metropolitan Area in Finland (OECD/ITF 2017c). Different scenarios are considered, differentiating, for instance, according to whether all private cars are being replaced or only a subset, whether all public transit trips with busses and rail continue or whether bus trips also are replaced by shared on-demand mobility services. Different shared mobility services are considered, typically with shared taxis (six passengers) and taxi buses (8–16 passengers); only the first Lisbon study (OECD/ITF 2015a) also considered sequential individual transport ("AutoVots"). There is also differentiation regarding whether the shared on-demand mobility service is provided with fully automated (driverless) vehicles or with a human driver.

In a scenario where all private car trips are replaced by shared taxi or taxi bus and all other trips are taken via public high capacity transit, walking and cycling, the simulation studies all arrive at the same conclusion: congestion is strongly reduced or disappears completely, and pollution is also drastically reduced. For Lisbon, the simulation showed if all cars and bus trips were replaced by a fleet of six-seat vehicles (shared taxis) that offer on-demand door-to-door shared rides in combination with a fleet of eight- and 16-person minibuses (taxi buses), the car fleet would only be 3 percent of the current fleet and total vehicle-kilometers would be reduced by 37 percent (OECD/ITF 2016a: 8). The benefits of shared mobility even increase when greater Metropolitan areas are considered, due to the greater importance of shared mobility services in providing feeder services to public transit. Even if only 50 percent or 20 percent of private car trips were replaced by on-demand shared mobility services and the bus services continued, there would still be a significant reduction of congestion and CO_2 to be expected for the Helsinki Metropolitan Area (OECD/ITF 2017c: 53). For Auckland, it was found that if all trips currently being made by private car were made by shared mobility services, congestion and emissions as well as distance driven would be cut in half. Even if the switch to shared mobility services was only partial, a significant effect on congestion and CO_2 could be observed (OECD/ITF 2017a:6).

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Digital Platforms: A Policy Framework for Developing Countries

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The views expressed in the paper are the authors' only.

Digital platforms are a disruptive force in developing countries, forcing policy makers to design policies to encourage platforms' broad adoption, while proactively addressing emerging risks. This policy framework should address four points. First, the definition of multisided-platforms; second, emerging business models; third, technology and behavioral enablers; and, fourth, platform competitive dynamics.

Digital platforms in emerging markets are a new phenomenon that deeply disrupts local economies. A full range of tools to exploit the opportunities platforms create, while addressing risks, is not available to policy makers; regulators, such as competition authorities and telecom regulators, are almost learning *while* doing, including on sensitive matters such as monitoring anticompetitive behavior and mergers. Platforms in high income markets followed an evolutive process. By contrast, developing countries play technology catch up, can leapfrog. Electronic identification in India is, for example, a massive effort to create, *ex novo*, a digital platform to support digital services, driving market maturity towards digital behaviors. This creates additional pressure on policy-makers, to rapidly address changing market conditions with limited analytical tools. The existing literature on digital platforms can help policy makers develop an effective framework for government action. Policy makers should address four aspects: first, the definition of multisided-platforms; second, emerging business models; third, technology and behavioral enablers; fourth, platform competitive dynamics.

Digital Platform Definition

Multi-sided platforms (MSP) are multisided marketplaces allowing for members of each side to interact through tools that facilitate matching, searching, exchanging, and carrying out transactions (Evans 2013). MSP benefit from positive network externalities, as the utility of each side increases with the increased number of participants on the other side. The increase in the economic utility of a product or technology as more customers start using complementary products or as more suppliers offer complementary products, is called indirect network effect (Clements 2004). Actions by upstream or downstream platform participants also affect each other, suggesting the need for policy makers to assess upstream and downstream markets. In addition, the definition of digital platforms does not fit within traditional corporate 'provision of goods and services' making it difficult to define transactions carried out within the platform to a given jurisdiction. This creates taxation issues, considering the recent EU state aid cases against Amazon (Luxembourg) and Apple (Ireland). Defining MSP in their jurisdictions can guide policy-makers in emerging markets identify taxation-related issues.

Platforms Business Models

A first analysis of emerging business models for multi-sided platforms (MSP), is present in Rochet and Tirole (2003), where the bargaining power of different participants drives revenues. Digital platforms organise decentralised information, making it available to market participants, and drastically slash transaction costs, creating new markets. Platforms can have 'loss leader segments' and 'profit making segments'. A critical distinction, with anti-trust implications, is the distinction between 'transaction-based' platforms, and 'non-transaction based' platforms. Recently, the Organisation for Economic Co-operation and Development (OECD) indicated that, when analyzing possible anti-competitive behavior, "if a market is a non-transaction market, looking at externalities is sufficient. If instead the market is a transaction market, then one should also check if there are transaction costs or, more generally, limits to the bilateral setting of prices among buyers and sellers or if there are platform constraints on pricing between customers on the two sides." (OECD 2018).

Using social networks, digital platforms can leverage a 'long tail' of market participants, increasing participants

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('tail lengthening') or expanding transactions ('tail fattening'). The value to advertisers of capturing long tail marketing data fosters marketplaces, such as MercadoLibre and americanas.com in Latin America. Hybrid models join MSP-enabled transactions and locational marketing. Four models emerged:

- Commission-based
- Subscription-based
- Advertisement-based
- Service-based

Platforms in emerging markets often mirror business models in high-income markets. Careem is a Dubai-based ride-sharing company, operating in 53 cities in the Middle East, North Africa, and Asia. The advertisement industry's relative underdevelopment is a constraint to certain models. This factor may limit the platforms' ability to subsidize the downstream, end-user side of the business. In addition, limited development of the advertisement market may encourage 'transactional' models (often developed by global,

Figure 1. Physical and Virtual Enablers

Source: Authors' own compilation

foreign platforms), to the detriment of pure marketplaces, which tend to be local. Policy-makers should assess the maturity of the advertisement industry, and its impact on business models: are there specific deficiencies that make a developing country particularly vulnerable to value-capturing models introduced by foreign platforms?

Platform Enablers

Digital platforms are the product of an evolutionary process mixing physical and behavioral enablers. Physical enablers include digital infrastructure (broadband internet networks, cloud, security), smartphones, laptops and other consumer equipment, payment tools, geo-localisation, and ancillary enablers (e.g. distribution, logistics, intermediary goods), (Figure 1).

Market and behavioral enablers are essential (Figure 2). Consumers shift their core attitudes from buying goods to access-based consumption, leading to a peer-to-peer economy where platforms increasingly mediate interactions, typically coordinated by peer-based trust relationships. Individuals casually participate in economic activities

Figure 2 .Market and Behavioral Enablers

Source: Authors' own compilation

through privately owned resources (assets, labor), which would otherwise remain idle. Platform enablers have policy implications.

Developing countries often lack a ubiquitous and affordable broadband internet infrastructure (Kelly and Rossotto 2012), and internet access is uneven among population groups (urban vs. rural, gender, age, and income divide). Some countries lack digital payments. Physical and virtual platform enablers in developing countries require dedicated policies, technical assistance and investments. Ecosystem enablers were key to Alibaba's development. Tsai (2016) emphasises "the integration of three critical elements, which are trading platform, payment system and logistics network, forms the solid infrastructure for Alibaba e-Commerce business ecosystem".

Sometimes, the specific economic condition of an emerging market may incentivise a more widespread platforms adoption with respect to high-income markets. Mobile-based payment tools in Africa addresses lack of alternative digital payment methods and inferior physical options,

allowing for rapid scaling-up. Digital platforms to match labor supply and demand gained traction in Ukraine, the Philippines, and Russia, leveraging competitive wages and skilled resources. Constraints may encourage innovation. Faced with local logistics shortcomings, Jumia Egypt, an online marketplace, has built its own motorcycles and delivery fleet. Finally, a question for policy makers is whether access to capital constrains platforms growth. Large scale platforms will attract considerable investments, but local startups will experience challenges.

Platform competitive dynamics

The dominance of a platform, arising from network effects ('winner-takes-all'), may raise competition concerns, if the dominant platform abuses its market power. However, penalising dominance per se may be inefficient as dominance can also benefit consumers and spur innovation. Reaching a 'critical' mass drives platform dynamics (Evans 2013). Ruutu et al. (2017) propose a system dynamics simulation model of platform competition, highlighting three cases. In the 'chicken-and-egg' scenario, no platform achieves a critical mass. In the 'winner-take-all' scenario a vendor locks-in the participants into one dominant platform, even in presence of 'multi-homing' options. The final scenario, called by other authors 'winner takes some', provides for a "collaboration and competition scenario in which several platforms coexist in balanced competition." (Ruutu et al. 2017). Various models studied the conditions for multiple platforms to grow first, and then co-exist in competitive markets. Network effects, 'critical mass' factors, and reversibility of participation create entry barriers, likely to be more critical in developing countries.

Network effects may lead to situations where a proprietary platform may be socially desirable, as it partially internalizes two-sided indirect network effects and direct competitive effects on the producer side. Ruutu et al. (2017) indicate that "if platform adopters are able to react quickly, achieving a critical mass may be difficult because the platform firms cannot accumulate enough resources for sufficient platform development". Open interfaces (reinforcing cross-side network effects) and user data transferability, can accelerate initial growth. These points will shape policy choices in developing countries.

Network effects and critical mass considerations could skew competition in favor of foreign platforms. However, there is evidence that local platforms in emerging markets can emerge as strong competitors. Leveraging domestic market size, Alibaba and Alipay emerged as global leaders (Tsai 2016). Go-Jek is a 'unicorn' in Indonesia, and leads the local ride-share market. Russian digital platforms revenues exceed $17 billion (World Bank 2018), as Yandex, a Russian engine, retained two thirds of Russia's addressable market, surpassing the revenues of Google Russia by a factor of three. Russian social media network Vkontakte outranked Instagram, Facebook, and Twitter in monthly messages sent, exceeding 60% share (World Bank 2018). Contrary to the idea of sweeping 'data colonialism', at least in large emerging markets like Russia, Indonesia and Brazil, there are counter-examples of local platforms effectively facing foreign competition. What determines a 'winner-takes-some' scenario in emerging markets? One hypothesis, consistent with standard MSP theory, suggests that in a two-sided market, 'winner-takes-all' prevails, *unless* there is sufficient consumer differentiation to determine an oligopolistic scenario. A further question is the sustainability of 'winner-takes-some' scenarios, considering technology advances such as artificial intelligence, which will, perhaps, reduce linguistic or cultural effects on consumer differentiation. Another aspect is whether local platforms can compete only leveraging large domestic markets: foreign platforms dominance is a more acute risk in small, poor countries.

While most of the debate focuses on dominance, platforms also raise other competition concerns: colluding algorithms, restrictive vertical agreements and potential anticompetitive effects of market consolidation. In addition to network externalities, two other factors characterise digital platforms dynamics. The first is *envelopment*, a business strategy by which a platform leverages its digital or brand presence, to expand its business to services outside its initial core. While traditional analysis of 'tying' as anticompetitive practice does not necessarily hold, the rationale is similar. As a digital platform, Google offers access to its platform to third party service providers, such as online translation software. However, it also develops its own online translation software. Client-supplier analysis in traditional industries calls for non-discriminatory access to a distribution platform to be granted to third party suppliers, especially when an economic agent acts as distributor and retailer. A similar analogy exists in digital platforms. Access to the search engine should be granted on a non-discriminatory basis to all third-party providers, including in-platform providers. Regulatory intervention may be warranted. The European Commission fined Google €2.42 billion for market dominance abuse (advantage to its own shopping service in search results). Brazil opened a similar investigation.

The second strategy is *partnerships*. Latin American platform MercadoLibre partnered with convenience store and financial services chain Oxxo, to integrate its distribution and service channels. Careem partnered with food delivery ChaCha, to address Pakistani's market. While partnerships

can enhance efficiency, they also raise competition concerns. Google's financial incentives for the largest smartphone and tablet manufacturers to exclusively pre-install Google Search on their devices, has been considered a vehicle to foreclose competitors. Following a recent investigation in Russia, Google committed to remove restrictions and allow third party applications on all devices. Assessing the competition impact should include effects on both downstream and upstream markets (Frieden 2018). Innovation should be considered in the assessment (Wahyuningtyas 2018).

The *use of data by digital platforms*, currently core to the debate, influences market dynamics, beyond consumer protection concerns. The use of data by dominant platforms can become abusive, absent strict controls either externally or self-imposed. The latter has worked poorly. If data is the price consumers pay to access a given service, such as 'connecting' via Facebook or 'searching' via Google, lack of transparency with data use might constitute abuse of dominant position equivalent to price gouging. This line of reasoning brings to consider data as a potential *essential facility*, where the arguments applied to infrastructure access extend to data. This concern is compounded in developing countries. Africa's mobile operators have an unmatchable quantity of users' data, displaying thus a dominant position around commercially sensitive information, absent adequate regulation. Platforms need user data to keep advertisers onboard. Data portability, enabling users "to transfer data from one electronic processing system and into another, without being prevented from doing so by the controller" (Graef et al. 2015), could be a powerful enabler.

Finally, *many actors cannot access platforms in emerging markets*, including consumers without access to internet networks or without smartphones, and SMEs with limited technology access. Hence, a possible rationale exists for proactive interventions to promote broad technology diffusion. Incentives for global platforms to localise their businesses and partner with local firms could be encouraged.

In conclusion, analysing these four pillars of the economic literature may guide policy makers towards appropriate policy frameworks for digital platforms in emerging markets.

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Regulatory Challenges for Share&Charge Models*

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The platform Share&Charge provides an innovative solution to the lack of electric vehicles charging infrastructure, lying at the crossroad of the electricity market, the transport market and digitalisation. This paper presents the functioning of Share&Charge and its potential, before assessing the tax treatment of operations involved in the use of the platform.

Introduction

Electric vehicle (EV) charging infrastructure is a central aspect of e-mobility deployement. Without a sufficient number of charging stations, consumer appeal for EVs remains low. The German platform Share&Charge offers an innovative solution to this problem by allowing the sharing of EV charging stations and enabling direct transactions between charging station owners and EV drivers in a peer-to-peer fashion[1]. Relying on new technological developments, Share&Charge lies at the crossroads of the electricity market, the transport market and digitalisation. Although this model creates new opportunities for sustainable mobility, it also presents specific features, involving new actors and structures that disrupt existing frameworks and bring new regulatory challenges.

This paper intends to examine some of the legal issues associated with the development of platforms like Share&Charge. The first part briefly presents the functioning of Share&Charge and its potential benefits for EVs scale-up, as well as for the deployment of decentralised electricity production. The second part is dedicated to the tax treatment of operations involved in the use of the platform, assuming that such a scheme would be introduced into the Belgian market. As Belgium is a federal State with decentralised competences, we assume that all actors within Share&Charge are located in the Walloon Region of Belgium. Finally, we conclude with several policy recommendations to foster models like Share&Charge.

Part I. Presentation of Share&Charge – functioning and benefits

Share&Charge is an intermediary platform that provides intermediary services to enable direct transactions between charging station owners and EV drivers (Plenter et al. 2018). It is operated by the company MotionWerk. Via the platform, the operator of a charging station may offer access to it for private and commercial customers. Share&Charge's interactive map makes it possible for EV owners to find a charging station in the most suitable location, for instance at their place of work or where they live. The operators set a price (tariff) on Share&Charge for their offer. The use of Share&Charge is free of charge for the customer, but operators have to pay a usage fee of 15 percent of the tariff to MotionWerk after the charging process. Charging tariffs within the charging station network are determined by the operator, but the platform provides indicative tariffs (Figure 1).

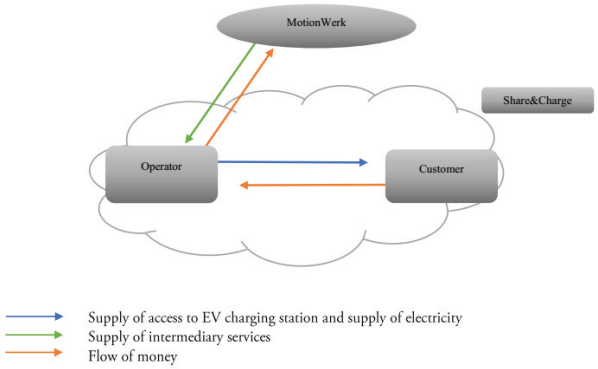

Figure 1. Relations between the users of Share&Charge

Source: Authors'own compilation

Two hypotheses can actually be made with respect to this model. In the first instance, the operators draw the elec-

[1] More information regarding the platform can be found at: https://shareandcharge.com (accessed August 2, 2018).

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tricity necessary to charge the EVs from the main utility grid. By contrast, in the second case, the same amount of electricity is self-produced by the operator, for instance through a photovoltaic installation.

Share&Charge presents certain features that could help in fostering the deployment of e-mobility and of decentralised electricity production. Firstly, Share&Charge help fill the gap of the lack in EVs charging infrastructure, which represents a major barrier to their market diffusion (Sierzchula, Bakker, Maat, van Wee 2014; Bakker and Trip 2013; Graham-Rowe et al. 2012). In particular, Share&Charge enables such infrastructure to be directly financed by individuals and private companies, as cost is being recouped from EV drivers through tariffs set for recharging their vehicles. Secundly, by increasing the number of charging stations, Share&Charge spreads electricity demand over a greater number of locations. This helps lower the impact of EV charging on the electricity grid and on electricity demand (Lopes, Soares, Almeida 2011), which can be particularly problematic in heavily populated areas. Furthermore, where the operator self-produces electricity, and upon condition that the electricity production is sufficient to cover the demand, Share&Charge also enables the reduction of problems related to grid overload and energy losses due to decentralised energy production by enabling electricity storage directly within the EV battery instead of on the grid, thus establishing local electricity consumption through microgrids. This further facilitates the expansion of decentralised electricity production and may reduce the needs for flexibility in the electricity market through a better matching between local energy production and local demand.

Part II. Legal framework and disruption – tax treatment of Share&Charge

Share&Charge presents specific features that pose regulatory challenges. In particular, this business model relies on a multi-sided platform and is based on decentralised electricity distribution and production; following the trend of the so-called sharing economy, it enables peer-to-peer access to EV charging stations and sales of electricity. These distinctive elements defy current tax rules, including those related to energy taxes (1), personal income tax (2) and value added tax (VAT) (3)[2]. Although we concentrate on Belgian tax law, the questions envisaged could be applicable in other countries. They could also provide arguments for further harmonisation at an European Union (EU) level.

Energy taxes

When European directives on the liberalisation of the electricity market were adopted, electricity generation, transmission and distribution were predominantly centralised[3]. This reality has progressively evolved, with the emergence of decentralised forms of electricity production and, more recently, microgrids. Current regulatory frameworks, both at the EU level and at the domestic level appear to have been overtaken by such new market developments. In Belgium, peer-to-peer sale of electricity remains unregulated; there is no specific legal provision that determines which rules should apply when one individual sells electricity to another individual.

The lack of specific framework on peer-to-peer sales of electricity poses several problems regarding energy taxes. Indeed, to determine the person liable for electricity taxes, tariffs and levies in the Share&Charge model, it is necessary to characterise the operators: should they be qualified as 'electricity distributors'(or suppliers) or, rather as 'end consumers'. In Belgian law, there is a clear distinction between these two concepts. An end consumer is defined as "any individual or legal entity buying electricity for *its own use*"[4]. This qualification will give rise to the payment of a number of taxes, levies and tariffs, including taxes on energy consumption and surcharges to support to the cost of a number of public policies and services. On the contrary, electricity distributors, which must be understood as an electricity supplier, qualify as the taxable person for the purpose of the energy contribution (Law of July 22, 1993[5]). They are defined as "the individual or legal entity selling electricity or gas on their account or on behalf of others"[6].

As the law currently stands, there is no clear answer to this paradox. Nevertheless, despite current developments from the Walloon regulatory authority (Cwape) and of the Walloon parliament, it seems hard to consider, without stretching the concepts, operators of charging stations as

[2] Energy taxation is understood in a broad meaning, including taxes sensu stricto, but also other parafiscal levies on energy like fees, tariffs, etc. Issues regarding corporate income tax will not be addressed; we will concentrate solely on the relationships between the operator and the customer. On this question, see the Proposal for a Council Directive of March, 21, 2018 on the common system of a digital services tax on revenues resulting from the provision of certain digital services, COM(2018) 148 final; and the Proposal for a Council Directive of March 1, 2018 laying down rules relating to the corporate taxation of a significant digital presence, COM(2018) 147 final.

[3] See Directive 96/92/EC of the European Parliament and of the Council of December 19, 1996 concerning common rules for the internal market in electricity, Official Journal L27, January 30, 1997 P. 20-29.

[4] See for instance Art. 2, 14°, of the federal law of April 29, 1999 on the organisation of the electricity market, Belgian Official Journal of May 11, 1999.

[5] Federal law introducing an energy contribution to safeguard competitiveness and employment, Belgian Official Journal of July 24, 1993.

[6] Art. 424 of the Program law of December 27, 2004, Belgian Official Journal of December 31, 2004.

end consumers[7]. In the event that these operators are not characterised as end consumers, they would be part of the electricity supply chain, and the end consumer would be the customer of the operator of a charging station. Such a qualification would imply several (undesirable) consequences. Notably, it would characterise operators as the taxable persons of the energy contribution, and require them to obtain a license for electricity supply. These elements call for a legislative intervention, in order to clarify the current legal framework and to adapt it to models like Share&Charge.

Further difficulties arise for users of Share&Charge in relation with the tarriffs charged when access is provided to the charging station. In the Share&Charge model, the operators determine themselves the tariffs to be paid by the customers when charging their EV, even though the platform provides indicative tariffs. Setting the tariffs can be troublesome for the operators although this represents a critical operation; they need to remain competitive with other operators of EV charging stations within Share&Charge but they also should make a profit or at least not lose money. Determination of the tariffs will be particularly delicate when the electricity used to charge the EV is self-produced by the operator. In this instance, they will need to take into account electricity consumed and electricity produced, which can be both unpredictible. For these reasons, and considering the fact that the operator may likely be an individual who does not necessarily have specialised knowledge and experience regarding the electricity market, there could be a case for provision of support services in order to assist the operator in setting appropriate tariffs. This role could be played by existing actors such as distribution system operators or regulators. Alternatively, there could be room for a new market segment to develop.

Personal income tax

Share&Charge represents the perfect example of what is known as the 'sharing economy'. As noted by the European Commission, the collaborative – or sharing – economy obscures and distorts "established lines between consumer and provider, employee and self-employed, or the professional and non-professional provision of services"[8]. Within the Share&Charge model, several issues arise regarding the qualification of pieces of income for the purpose of the personal income tax treatment. Belgian tax law distinguishes between four categories of income: professional income, income from movable property, income from immovable property, and miscellaneous income. Qualifying the form of income is critical as each income category is governed by its own rules, which allows for the determination of what is taxable income, its amount, and the deductions that apply. In addition, it is necessary to determine whether the income resulting from different operations must be taxed separately, under different categories, or instead should be taxed together, within one single category.

Characterisation of the income will depend on the specific elements of each situation; it will be assessed on a case-by-case analysis, based on various criteria such as activity financing with high levels of credits, whether the activity is the extension of or closely linked to a professional activity, the number and the frequency of the operations/transactions and remunerations (Tiberghien 2018, n°1096). Elements such as access limitation to the platform for a maximal cumulated period and for a maximal amount of income generated through the platform represent arguments in favour of non-professional income[9]. Share&Charge's terms and conditions, on the contrary, do not contain such limitations. If the income is regarded as non-professional, it is necessary to determine in which remaining category it belongs: income from movable property, income from immovable property and miscellaneous income. In that case, income resulting from the sale of electricity will be regarded as a miscellanous income[10], while income resulting from the use of the EV charging station within the Share&Charge model should be qualified, in our view, as income resulting from an immovable property. Alternatively, both income could be taxed together, as one single piece of income.

It is interesting to note that since recently, miscellaneous income resulting from the sharing economy benefits from

[7] More specifically see note CD-13k07-CWaPE of September 12, 2013 on the conditions to fulfill for an end consumer to be considered a producer in the specific hypothesis of an ordinary lease or a 'all included' rental of buildings equipped with PV panels, accessible at https://www.cwape.be/?dir=3&news=293, last accessed August, 2, 2018, which complements the Guidelines CD-13k07-CWaPE of September 12, 2013 on the conditions to fulfill for an end consumer to be considered a producer ; decision CD-10d13-Cwape of April 13, 2010, accessible at https://www.cwape.be/?dir=0.2&docid=134, last accessed August, 2, 2018; and decision CD-17h11-Cwape of August 10, 2017, accessible at https://www.cwape.be/?dir=0.2&docid=3248, last accessed August, 2, 2018; Draft bill of January 1, 2018, modifying the Decree of April 12, 2004, on the electricity market organisation for the deployment of smart meters and flexibility, in particular Art. 9, accessible at https://www.cwape.be/?dir=4&news=772, last accessed August, 2, 2018. See also the advice of the Cwape: Advice CD-18c01-CWaPE-1771 of March 2, 2018, on the Draft bill of January 1, 2018, modifying the Decree of April 12, 2004, on the electricity market organization for the deployment of smart meters and flexibility, in particular p. 19, accessible at https://www.cwape.be/?dir=4&news=772, last accessed August, 2, 2018.

[8] Communication of June 2, 2016, COM(2016) 356 final, p. 2.

[9] Belgian Ruling Authority, Ruling n°2015.455 of September 29, 2015. For more information see https://www.ruling.be/fr/telechargement/decisions, accessed August 2, 2018

[10] Chamber of the Representatives, Oral questions n° 5400 et 5401 of 20 May 2008; n° 587 of July 15, 2009.

a preferential tax rate[11]. However, the scope of this favourable scheme is rather narrow as it only applies to benefits and profits resulting from services (Art. 90, 1st lid, 1°bis, Income Tax Code hereafter 'ITC'), exluding income resulting from the supply of goods. Although these concepts are not defined, we would argue that income resulting from the use of Share&Charge must not be considered to result from supply of services. Arguably, one could purport that a portion of the supply should be regarded as a supply of service. In this case, this piece of income would be treated favourably, accordingly with Art. 90, lid 3 ITC.

VAT

Unlike personal income tax which is calculated based purely on national rules, VAT has been harmonised at EU level. To determine the VAT treatment of the transactions, several questions need to be answered including 'who is the taxable person' and 'what are the taxable transactions'. As underlined by the European Commission, collaborative platforms pose several difficulties in this regard: "[p]roblems may arise in respect of the qualification of participants as taxable persons, particularly regarding the assessment of economic activities carried on, or the existence of a direct link between the supplies and the remuneration in kind (…)" (Beretta 2018).[12] In addition, characterisation as a taxable person can be burdensome for individuals, especially when their activity generates modest value, since such qualification implies to fulfil several obligations: notifying the existence of an economic activity, issuing regular invoices, keeping regular accounts and submitting periodic and regular VAT returns, etc[13].

A first issue is to determine who from the operator or MotionWerk must be considered the taxable person vis-à-vis activities supplied to the customer. After, it is necessary to assess whether sharing of the charging station, and the subsequent sale of electricity must be considered an economic activity. The first issue brings us to the delicate distinction between undisclosed agents, who act in the name and on behalf on someonelse, and disclosed agents (or commissioner), who act in their own names. It must be noted that the concept of intermediaries in the presence of platforms has been interpreted in other fields of law by the European Court of Justice, with respect to the platform Uber[14]. In two judgements, the Court concluded that Uber was not a mere intermediation service provider, but rather performed transport services. Nevertheless, because VAT encompasses autonomous concepts, one should be cautious when attempting to draw conclusions from these developments; it is uncertain whether they could be translated to VAT law or not. Depending on the interpretation, the VAT treatment of the operations performed in the context of Share&Charge will profoundly vary.

The second question is to determine whether the operations supplied characterise as economic activities. In Belgian VAT law, a favourable treatment applies to activities of the sharing economy, based on the premise that such activities are not economic activities. Under this scheme, the supply of services performed in the context of the sharing economy is not, upon the respect of several conditions, subject to VAT, and suppliers of these services are not taxable persons for the purpose of VAT. In the case of Share&Charge, because the intervention of the operator of Share&Charge includes a supply of goods (electricity supply), it will fall outside the scope of this favourable scheme.

Ultimately, determining the VAT treatment of operations supplied within Share&Charge requires to qualify these transactions. Electricity supply must be regarded as a supply of goods, while the supply of access to the station is a supply of a service. Both transactions are liable to a VAT rate of 21 percent[15]. Services of intermediation, when MotionWerk is considered an undisclosed agent, arguably constitute electronically supplied services, as referred to in Art. 56 of the VAT Directive. Depending on the interpretation, these operations will be regarded as one single economic transaction or, on the contrary, as two distinct operations[16].

Conclusion and policy recommendations

Markets have entered into a digital age. Digitalisation impacts most aspects of everyday life, ranging from commuting, ordering food, to renting an apartment or a car, or just chatting on the phone. It can be admittedly a source of certain abuse, but it is also a factor of progress, which creates many societal and economic opportunities. Based on this background, the Share&Charge model offers new opportunities for EVs market diffusion and for decentralised electricity production devolpment. To foster business models like Share&Charge, the following modifications to current regulations could be implemented:

- Firstly, uncertainties have been observed regarding the legal qualification of several elements, such as the

[11] Program Law of July 1, 2016, Belgian Official Journal July 4, 2016. See Afschrift 2016; Mariscal & Ickx 2016.
[12] Communication of June 2, 2016 on the Agenda collaborative economy, aforementioned note 34.
[13] Title VIII of VAT code.
[14] E.C.J. Elite Taxi v. Uber Systems SpainSL, C-434/15, December 20, 2017 ; E.C.J., Uber France SAS, C-320/16, April 10, 2018.
[15] Respectively Art. 15 Directive 2006/112 & Art. 9 Belgian VAT code, and Art. 24 & f. Directive 2006/112 & Art. 18 Belgian VAT code.
[16] See notably E.C.J., Město Žamberk, C-18/12, February 21, 2013; E.C.J., Levob Verzekeringen and OV Bank, C-41/04, October 27, 2005, especially § 22; E.C.J., Part Service, C-425/06, February 21, 2008, especially § 53; E.C.J., C-497/09, Bog and Others, especially § 53; E.C.J., CPP, C-349/96, February 25, 1999, in particular § 30.

qualification of the operator with respect to energy taxes, or of MotionWerk as a taxable person with regard to VAT. Yet these are essential to accurately assess the tax treatment of operations associated with the use of Share&Charge. The adoption of guidelines at the EU level or the modification or current directives should be considered to remove unclarity.

- Secondly, one feature of the sharing economy is that transactions and activities are not necessarily performed by professionals. Therefore, if participants are treated just as any professional exercising an economic activity, they may be subject to an excessive burden, which would risk impeding the furtherance of their activities. Current frameworks should be modified to take this element into account. In addition, services could be performed by regulators, DSOs, or by new actors, to assist operators to set appropriate tariffs for the provision of electricity.
- Thirdly, income generated and operations performed by the operator do not currently benefit from any financial support, nor do they benefit from the favourable tax scheme applicable to the sharing economy. Further studies are required to assess whether financial support is needed to foster the development of such a model as Share&Charge.
- Finally, the Share&Charge model merely involves internal relations within one jurisdiction. Many legal questions would arise, including those of tax base erosion, profit shifting and of double imposition, if that was not the case. These issues also deserve due attention among scholars and policy makers.

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Following the usual approach of the Florence School of Regulation, stakeholders and academics will join the Air Forum, for the first time being organized in Budapest, and actively debate the most important topics in the field of air transport. On this occasion, the discussion will revolve around the Single European Sky (SES) and its development in the coming 10-15 years.

Florence Conference on the Regulation of Railways
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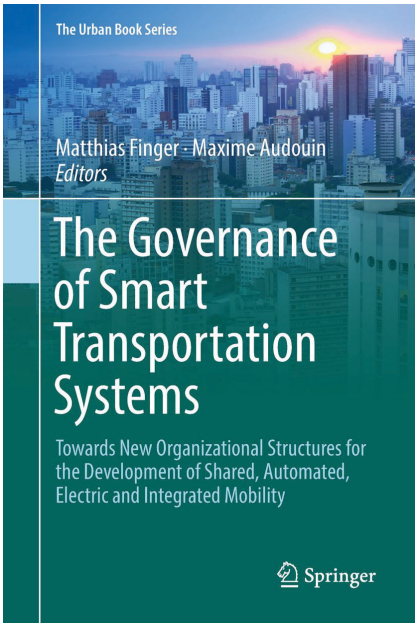
17th Florence Rail Forum. Green Finance against Climate Change – which role for Railways?
December 7, 2018

Following the usual approach of the Florence School of Regulation, stakeholders and academics will join the 17th Florence Rail Forum to discuss the most pressing rail regulatory issues. On this occasion, the discussion will revolve around the topic of "Green Finance against Climate Change – which role for Railways?". We will assess how railways can become a more effective tool in the fight against climate change, in particular by looking at green financing and by exploring the various green financing mechanisms as potentially applicable to railways.



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networkindustries quarterly

Network Industries Quarterly, Vol. 20, issue 4, 2018 (December)

"The path towards digitalization in road infrastructure"

Presentation of the next issue

Any region or country requires an efficient and effective transportation system as the fundamental basis for economic development, creation of jobs, and, ultimately, improvement of the citizens' well-being. Over the last centuries, roads have served well, connecting regions and facilitating economic trade. Roads became the backbone of transportation systems, unlocking the development growth in many regions and countries. For example, in the EU, roads are responsible for 75% of freight transport and nearly 90% of passenger transport. But there is a new challenge that will reshape the way we build, manage and operate roads: digitalization.

Digitalization in the road sector is changing the traditional service-based perspective, where the infrastructure is at the center of the strategy, towards a user-based perspective, offering solutions to improve and optimise travels, provide additional services, foster integrated and shared mobility solutions, allowing roads to become an active (and smart) element of the physical and digital mobility system.

What are the challenges for road managers? What can the users expect from the new user-based perspective? Will congestion be a problem of the past? Will 'smart' roads be cheaper or more expensive? Will technology change the decision-making process for the selection and management of road projects?

These are some examples of questions to be addressed in this special issue, containing a set of contributions that could stimulate future research in this promising field.

Guest Editor

The guest editor of this special issue is **Dr. Carlos Oliveira Cruz,** Assistant Professor at Instituto Superior Técnico (University of Lisbon) and a Researcher at Civil Engineering Research and Innovation for Sustainability (CERIS), **oliveira.cruz@tecnico.ulisboa.pt**

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Vol. 20, issue 4, 2018 (December)

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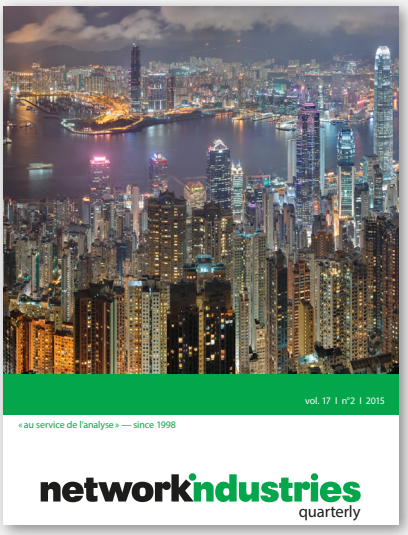

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